

CNC TECHNOLOGY

UNIT - I INTRODUCTION TO CNC MACHINE TOOL

CNC (Computer Numerical Control), the instructions are stored as a program in a micro-computer attached to the machine. The computer will also handle much of the control logic of the machine, making it more adaptable than earlier hard-wired controllers

ADVANTAGES OF CNC TECHNOLOGY

- CNC Machining Produces Little to No Waste.
- Zero Defects and Greater Accuracy.
- Faster and Efficient Production.
- Quicker Assembly.
- Enhanced Personnel Safety.
- Reduction in Energy Consumption.
- CNC Machining Leads to Lower Production Costs.
- Complex Geometry
- Reliability & Scalability
- Fewer Workers are required.



APPLICATIONS OF CNC MACHINES

- CNC machining is used extensively in the Oil and Gas industry for various applications, including manufacturing components for drilling equipment, valves, pumps, and pipelines. It's also used in the fabrication
- CNC machining is a manufacturing process used in a variety of industries, including automotive, aerospace, construction, and agriculture
- CNC machining processes are suitable for a variety of engineering materials, including metals (such as aluminum, brass, stainless steel, alloy steel, etc.), plastics (such as PEEK, PTFE, nylon, etc.), wood, foam, composite materials, etc

INDUSTRIES THAT USE CNC MACHINING

- Aerospace Industry
- Automobile Industry
- Defence Industry
- Consumer Electronics
- Healthcare Sector
- Oil & Gas Industry
- Manufacturing field

APPLICATIONS

AEROSPACE INDUSTRY

- The machining of metal aircraft components occurs at the highest level of precision. This is highly essential for safety-critical applications.
- The applications of [CNC machining in the aerospace industry](#) are wide and reliable. Some of the machinable aerospace components include engine mounts, fuel flow components, landing gear components, and fuel access panels.



AUTOMOBILE INDUSTRY

- The automotive industry regularly enjoys the uses of CNC milling machine for both prototyping and production. Extruded metal can be machined into cylinder blocks, gearboxes, valves, axels, and various other components.
- [CNC machining in the automotive industry](#) is also useful for creating one-off custom parts. The creation of various replacement parts is also possible with CNC.



APPLICATIONS

DEFENCE INDUSTRY

- The military sector frequently turns to CNC machining for the prototyping of rugged and reliable parts. The intention of the machining is to work well for parts that demand constant innovation and security.
- Many of these parts overlap with other industries such as aerospace and electronics. The ability of CNC machines to provide on-demand replacement parts.



CONSUMER ELECTRONICS

- CNC machining also helps in the prototyping and production of consumer electronics. These electronics include laptops, smartphones, and many others. The chassis of an Apple MacBook, for example, comes from the CNC machining of extruded aluminum and then anodized.
- In the electronics industry, CNC machining helps to create PCBs, housings, jigs, fixtures, and other components.



APPLICATIONS

HEALTHCARE SECTOR

- CNC machining offers its use on various medically safe materials. Since the process is suited to one-off custom parts, it has many applications in the medical industry. The tight tolerances afforded by CNC machining are essential to the high performance of machined medical components.
- CNC machinable medical parts include surgical instruments, electronic enclosures, orthotics, and implants.



OIL & GAS INDUSTRY

- Another industry that requires tight tolerances for the safety-critical application of CNC lathe is the oil and gas industry. This sector leverage the uses of CNC milling machine for precise, reliable parts such as pistons, cylinders, rods, pins, and valves.
- These parts are often used in pipelines or refineries.

